

## Claims

[1] An ionomer obtained by reacting metal compound particles having an average particle diameter of 1  $\mu\text{m}$  or less, with a functional group-containing polymer.

5 [2] An ionomer according to Claim 1, wherein a proportion of the metal compound particles is 0.01 to 10 parts by mass relative to 100 parts by mass of the functional group-containing polymer.

[3] An ionomer according to Claim 1 or 2, wherein a metal  
10 component in the metal compound particles is at least one kind of metal selected from the group consisting of sodium, magnesium, calcium, zirconium, zinc and aluminum.

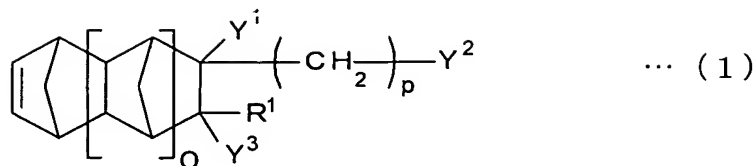
[4] An ionomer according to Claim 1 or 2, wherein the metal compound particles are made of zinc oxide.

15 [5] An ionomer according to any of Claims 1 to 4, wherein the functional group-containing polymer is an olefin-based random copolymer obtained by copolymerizing ethylene, an  $\alpha$ -olefin having 3 to 10 carbon atoms, a functional group-containing unsaturated monomer and, as necessary, a non-  
20 conjugated diene.

[6] An ionomer according to Claim 5, wherein a functional group in the functional group-containing unsaturated monomer is carboxyl group, hydroxyl group, epoxy group or sulfonic acid group.

25 [7] An ionomer according to Claim 5, wherein the functional group-containing unsaturated monomer is a functional cyclic compound represented by the following general formula (1):

[Formula 1]



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[in the general formula (1), R<sup>1</sup> is a hydrogen atom or a hydrocarbon group having 1 to 10 carbon atoms; Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> are each independently a hydrogen atom, a hydrocarbon group having 1 to 10 carbon atoms or -COOH with a proviso that at least one of Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> is -COOH and, when two or more of Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> are -COOH, they may combine to each other to form an acid anhydride [-CO-(O)-CO-]; o is an integer of 0 to 2; and p is an integer of 0 to 5].

[8] An ionomer according to Claim 5, wherein the olefin-based random copolymer is a copolymer obtained by copolymerizing 35 to 94.99 mol % of ethylene, 5 to 50 mol % of an α-olefin having 3 to 10 carbon atoms, 0.01 to 5 mol % of a functional cyclic compound represented by the general formula (1) and 0 to 10 mol % of a non-conjugated diene.

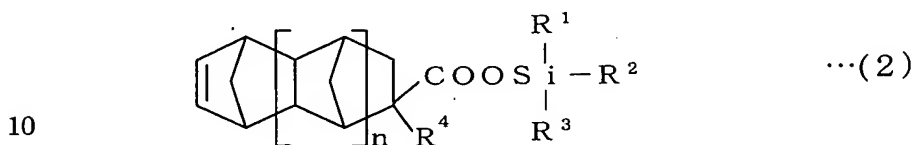
[9] A process for producing an ionomer, which comprises a step of subjecting a functional group-containing polymer to a heat treatment or a dynamic heat treatment in the presence of metal compound particles having an average particle diameter of 1 μm or less.

[10] A molded article obtained by molding a molding material containing an ionomer set forth in any of Claims 1 to 8, by a molding method selected from injection molding, extrusion molding, vacuum molding, powder slush molding, calender molding, transfer molding, solvent casting and press molding.

[11] A process for producing an ionomer, which comprises

subjecting, to a dynamic heat treatment, a metal compound and an olefin-based random copolymer obtained by copolymerizing ethylene, an  $\alpha$ -olefin having 3 to 10 carbon atoms and a functional cyclic compound represented by the following  
 5 general formula (2):

[Formula 2]



[in the general formula (2), n is 0 or 1; and  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$  and  
 15  $\text{R}^4$  are each independently a hydrogen atom, a halogen atom or a mono-valent organic group].

[12] A process for producing an ionomer according to Claim 11, wherein  $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$  and  $\text{R}^4$  are each independently a hydrogen atom or a hydrocarbon group having 1 to 20 carbon  
 20 atoms in the above mentioned general formula (2).

[13] A process for producing an ionomer according to Claim 11 or 12, wherein all of  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  are an ethyl group, or one of  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  is a tert-butyl group and the remaining two are each a methyl group in the above mentioned general  
 25 formula (2).

[14] A process for producing an ionomer according to any of Claims 11 to 13, wherein, in the above mentioned general formula (2),  $\text{R}^4$  is a methyl group.

[15] A process for producing an ionomer according to any of Claims 11 to 14, wherein the olefin-based random copolymer is obtained by copolymerizing 35 to 94.99 mol % of the ethylene, 5 to 50 mol % of the  $\alpha$ -olefin having 3 to 10 carbon atoms and 0.01 to 5 mol % of the functional cyclic compound represented by the above mentioned general formula (2), and 100 parts by mass of the olefin-based random copolymer and 0.1 to 20 parts by mass of the metal compound are subjected to a dynamic heat treatment at 120 to 350°C at a shear rate of 10 to 2,000/sec.

[16] A process for producing an ionomer according to any of Claims 11 to 15, wherein the olefin-based random copolymer is obtained by copolymerizing the ethylene, the  $\alpha$ -olefin having 3 to 10 carbon atoms, the functional cyclic compound represented by the above mentioned general formula (2) and a non-conjugated diene.

[17] A process for producing an ionomer according to Claim 16, wherein the olefin-based random copolymer is obtained by copolymerizing the ethylene, the  $\alpha$ -olefin, the functional cyclic compound represented by the above mentioned general formula (2) and 10 mol % or less of the non-conjugated diene.

[18] A process for producing an ionomer according to any of Claims 11 to 17, wherein the metal compound is a metal oxide or a metal hydroxide.

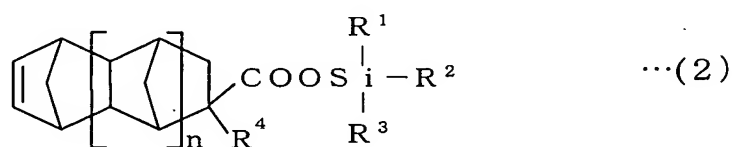
[19] An ionomer obtained a process for producing an ionomer set forth in any of Claims 11 to 18.

[20] A process for producing an ionomer composition, which comprises subjecting 100 parts by mass of an olefin-based random copolymer obtained by copolymerizing 35 to 94.99 mol % of ethylene, 5 to 50 mol % of an  $\alpha$ -olefin having 3 to 10

carbon atoms, 0.01 to 5 mol % of a functional cyclic compound represented by the following general formula (2) and 0 to 10 mol % of a non-conjugated diene, 0.1 to 20 parts by mass of a metal compound, and 300 parts by mass or less of a polymer  
 5 compound selected from a thermoplastic resin and a rubber and/or 100 parts by mass or less of a softening agent, to a dynamic heat treatment at 120 to 350°C at a shear rate of 10 to 2,000/sec:

[Formula 3]

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[in the general formula (2), n is 0 or 1; and R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and  
 15 R<sup>4</sup> are each independently a hydrogen atom, a halogen atom or a mono-valent organic group].

[21] An ionomer composition obtained by a process for producing an ionomer composition set forth in Claim 20.